

REMARKS

This Amendment responds to the Office Action mailed January 14, 2004 in the above-identified application. Based on the foregoing amendments and the following comments, reconsideration and allowance of the application are respectfully requested.

Claims 1-23 were previously pending in the application. By this Amendment, claim 1 is cancelled without prejudice or disclaimer. Claims 2, 3, 5-8, 10, 11, 16 and 20 have been amended. New claim 24 has been added. As a result, claims 2-24 are pending for examination, with claims 9, 14, 19 and 24 being independent claims. No new matter has been added.

The Examiner has objected to the language and format of the Abstract. A substitute Abstract is enclosed. Accordingly, withdrawal of the objection to the Abstract is respectfully requested.

The Examiner has suggested that section headings be added on pages 4 and 5 of the specification. Section headings have been amended, added and deleted. The amended section headings are in compliance with the suggested guidelines. Accordingly, withdrawal of the objection is respectfully requested.

The Examiner has objected to the drawings and has suggested that units of the x and y axes be added to Figs. 4 and 5. Enclosed herewith are photocopies of Figs. 4 and 5 with proposed changes marked in red. Approval of the proposed drawing corrections is respectfully requested.

The Examiner has objected to claims 1-8, 10-12 and 20-22 because the acronyms must be spelled out when they first appear in the claims. The claims have been amended to spell out acronyms when they first appear. Accordingly, withdrawal of the objection to claims 1-8, 10-12 and 20-22 is respectfully requested.

The Examiner has rejected claims 1-7 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner asserts that certain language in claims 1 and 7 is unclear. Claim 1 has been cancelled without prejudice or disclaimer and has been rewritten as new claim 24. Claim 7 has been amended to eliminate the phrase that is alleged to be unclear. Claims 2, 3, 5-8, 10, 11, 16 and 20 have been amended for clarification. New claim 24 is in compliance with 35 U.S.C. §112, second paragraph. Accordingly, withdrawal of the rejection under 35 U.S.C. §112, second paragraph, is respectfully requested.

The Examiner has rejected claims 1, 3-10, 13-15, 18-20 and 23 under 35 U.S.C. §103(a) as unpatentable over Sands et al. (U.S. 6,134,283) in view of Hardcastle et al. (U.S. 6,178,025). Claims 2, 11-12, 16-17 and 21-22 are rejected under 35 U.S.C. §103(a) as unpatentable over Sands et al. in view of Hardcastle et al. as applied to claims 1, 10, 15 and 20, and further in view of Isaksson et al. (WO 99/43123). The rejections are respectfully traversed.

The Sands patent discloses techniques for synchronizing transmissions and receptions of a data transmission system utilizing time division duplexing. The synchronization techniques can utilize cross-talk interference levels to obtain synchronization (Abstract). The disclosed technique includes measuring an energy amount for each of a plurality of consecutive frames of received data, detecting an edge in the plurality of consecutive frames of the received data based on the measured energy amounts, and computing an alignment error estimate using the edge detected in the plurality of consecutive frames. The synchronization may thereafter be adjusted in accordance with the alignment error estimate (col. 6, lines 13-27). Sands contains no disclosure or suggestion of performing a correlation between a received DMT signal and a delayed copy of the received signal.

The Hardcastle patent discloses techniques for detecting loss of optical signal in a synchronous communications system by detecting features of a monitor signal occurring at a detection frequency corresponding to the frame rate. An autocorrelation circuit utilizes delays which are an integral multiple of the frame rate and produces a detection value which is compared with a threshold value (Abstract). In Hardcastle, only one optical transmission line is discussed, and the problem of synchronizing frames is not discussed. In Hardcastle, autocorrelation is used only to indicate a loss of synchronization on the transmission line.

New claim 24 is directed to a method for keeping Discrete Multi Tone (DMT) frames aligned to the same frame timing, for use in a telecommunications transmission system using a DMT system as a multicarrier system and having at least two Very high rate Digital Subscriber Line (VDSL) systems, each comprising a pair of modems, said at least two VDSL systems belonging to a single binder group common to both VDSL systems. The method comprises a) effecting a correlation between a received DMT signal comprising DMT symbols having cyclic extensions and a delayed copy of the received signal, b) detecting correlation maxima which determine the frame boundaries of different DMT components of the received signal, c)

estimating the time misalignment from the correlation maxima, and d) using the estimate by the modem to synchronize its own frame timing to a main cross-talkers frame timing.

The Sands patent does not disclose or suggest methods for synchronizing time division duplex transceivers which utilize correlation as claimed. In particular, Sands does not disclose or suggest effecting a correlation between a received DMT signal and a delayed copy of the received signal, detecting correlation maxima and estimating time misalignment from the correlation maxima, as required by new claim 24. The Examiner acknowledges that Sands does not teach autocorrelation, but relies on Hardcastle for this feature. However, the Hardcastle patent does not provide the teachings that are lacking in Sands. While Hardcastle discloses an autocorrelation circuit, autocorrelation is utilized to detect a loss of signal condition on a single transmission line. Thus, Hardcastle does not disclose or suggest detecting correlation maxima which determine frame boundaries of different DMT components of the received signal, estimating time misalignment from the correlation maxima and using the estimate by the modem to synchronize its own frame timing to a main cross-talkers frame timing, as required by claim 24. Accordingly, Sands and Hardcastle, taken individually or in combination, do not disclose or suggest the limitations of claim 24. Therefore, claim 24 is clearly and patentably distinguished over Sands in view of Hardcastle.

Because Hardcastle describes techniques for detecting loss of optical signal on a single transmission line, the skilled person addressing the problem of crosstalk in a transmission system would have no reason to consult Hardcastle or to utilize the autocorrelation technique described by Hardcastle. Accordingly, it is submitted that the combination of Sands and Hardcastle is improper and should be withdrawn.

The Isaksson publication, cited against claims 2, 11-12, 16-17 and 21-22, does not provide the teachings that are lacking in Sands and Hardcastle. Isaksson is cited for disclosing cyclic extensions.

Claims 2-8 depend from claim 24 and are patentable over Sands for at least the reasons discussed above in connection with claim 24.

Claim 9 is directed to a method comprising a) receiving a carrier signal on a transmission channel, b) applying an autocorrelation function to the carrier signal to generate a correlation signal, c) detecting correlation maxima of the carrier signal and correlation maxima of a cross-talk signal in the correlation signal, d) determining a time misalignment between the carrier

signal and the cross-talk signal based on a time shift of the correlation maxima of the carrier signal and the cross-talk signal, and e) adjusting a frame timing of the carrier signal based on the time misalignment.

As discussed above in connection with claim 24, Sands contains no disclosure of utilizing an autocorrelation function to adjust frame timing. Furthermore, Hardcastle describes the use of autocorrelation in connection with loss of optical signal detection on a single transmission line. Accordingly, Sands and Hardcastle, taken individually or in combination, do not disclose the limitations of claim 9. For these reasons and for the reasons discussed above in connection with claim 24, claim 9 is clearly and patentably distinguished over Sands in view of Hardcastle.

Claims 10-13 depend from claim 9 and are patentable over Sands in view of Hardcastle for at least the reasons discussed above in connection with claims 24 and 9.

Claim 14 is directed to a method for use in a Very high bit rate Digital Subscriber Line (VDSL) communications system comprising a plurality of modem pairs, each modem pair including a first VDSL modem and a second VDSL modem. Claim 14 contains method limitations that parallel the limitations of claim 9. Claim 14 is clearly and patentably distinguished over Sands in view of Hardcastle for at least the reasons discussed above in connection with claims 24 and 9.

Claims 15-18 depend from claim 14 and are patentable over Sands in view of Hardcastle for at least the reasons discussed above in connection with claims 24, 9 and 14.

Claim 19 is directed to apparatus for use in a communications system having a transmission channel and contains apparatus limitations that parallel the method limitations of claim 9. Claim 19 is clearly patentable over Sands in view of Hardcastle for at least the reasons discussed above in connection with claims 24, 9 and 14.

Claims 20-23 depend from claim 19 and are patentable over Sands in view of Hardcastle for at least the reasons discussed above in connection with claims 24, 9, 14 and 19.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the undersigned at the telephone number listed below.

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Art Unit: 2634

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,
Isaksson et al., Applicant(s)

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Annotated Sheet Showing Changes

Fig 4

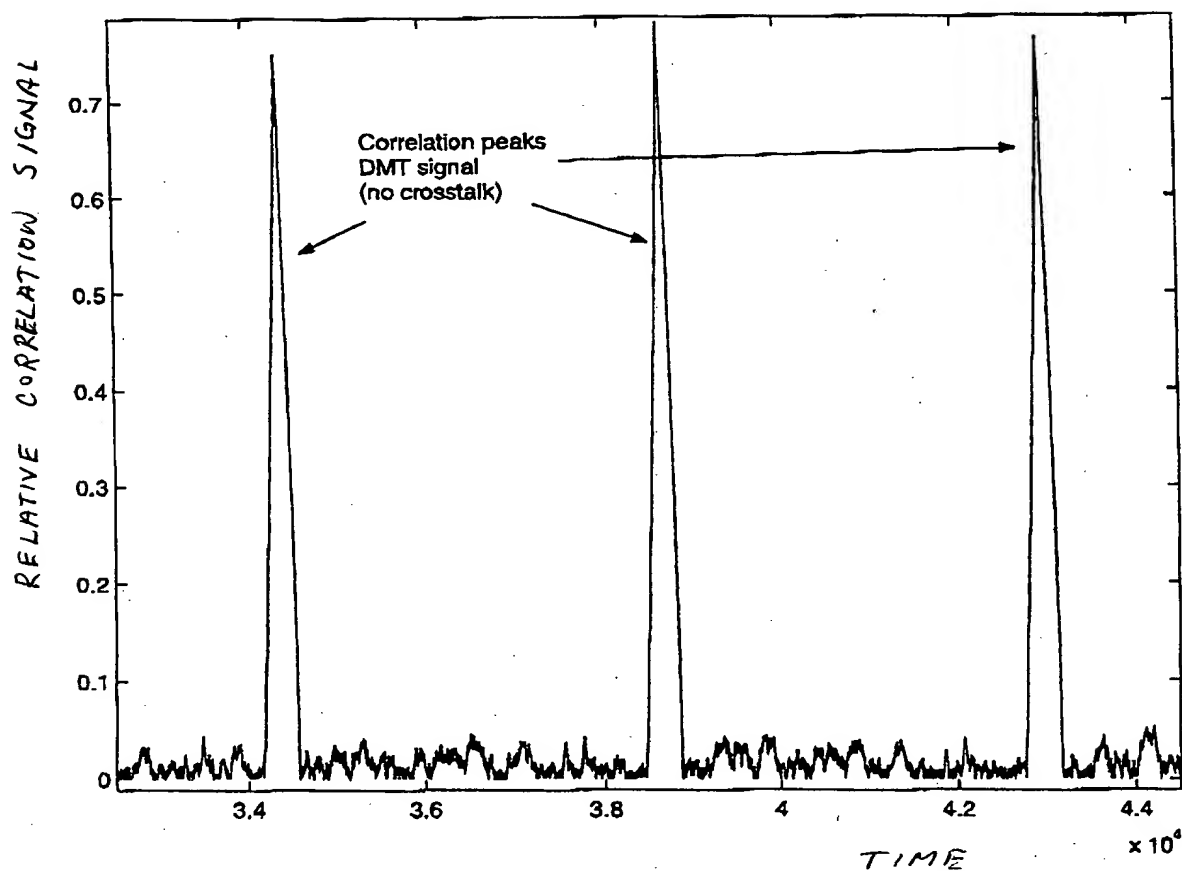




Fig 5

